TRIBHUVANUNIVERSITY
INSTITUTE OF ENGINEERING

KANTIPUR ENGINEERING COLLEGE

Model Questions for B.E. Entrance Test (2073)

Set: III (B) **Time: 2 hours** **Date: 2073/04/08**

Section: I Select the Best Alternative on the answer sheet given **60×1 = 60**

1. Which of the following is compulsory in a four stroke petrol engine?
(A) port (B) spark plug (C) fuel injector (D) none

2. In diesel the ignition takes place because of ……..
(A) mixed effect of spark and compression (B) spark
(C) high compression (D) none

3. Which of the following in not the example of renewal type of source of energy.
(A) coal (B) wind energy (C) solar (D) bioethanol

4. The lumps formed by heating lime stone and clay with other raw materials for cement is called….. …
(A) aggregate (B) brick (C) stone (D) clinker

5. Sand is also known as …….
(A) stone (B) coarse aggregate (C) both a and b (D) fine aggregate

6. In vertically placed traffic light signals, which color is on the middle ?
(A) black (B) red (C) green (D) yellow

7. Zebra crossing on roads are for crossing the roads for…..?
(A) pedestrians (B) light vehicles (C) only two wheelers (D) heavy vehicles

8. The source of energy which is not derived from the fossils is
(A) wind (B) diesel (C) coal (D) petrol

9. The main purpose of using core in a transformer is to
(A) decrease reluctance of the common magnetic circuit (B) Prevent eddy current
(C) eliminate magnetic hysteresis (D) decrease iron losses

10. Ohm's law defines …….
(A) voltage, capacitance (B) current, power (C) voltage, current, resistance (D) none

11. For a sixteen bit system one word is equal to ….
(A) 8 bit (B) 10 bit (C) 16 bit (D) 12 bit

12. Which of the following is not the function of not gate ….
(A) compliment a signal (B) invert an input signal
(C) stop a signal (D) change the logic in digital circuit

13. Which of the following is internet browser?
(A) MS word (B) google chrome (C) MS excel (D) all of above

14. Which of the following is pointing device ….
(A) RAM (B) mouse (C) hard disc (D) all of above

15. Let A = {1, 2, 3, 4} and B = {2, 4} then n{(A × B) n (B × A)} is
(A) 0 (B) 4 (C) 3 (D) 2

16. If both roots of the equation $2x^2 - (m - 7)x + n = 0$ are zero then the values of m and n are respectively
(A) 0, 7 (B) 7, 0 (C) 2, 0 (D) 0, 2

17. The general solution of $7\sin^2 x + 3\cos^2 x = 4$ is
(A) $n\pi \pm \frac{\pi}{6}$ (B) $n\pi \pm \frac{\pi}{4}$ (C) $n\pi \pm \frac{\pi}{3}$ (D) $n\pi \pm \frac{\pi}{2}$

18. If A = $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ then $A^2 + 2A$ is

(A) A (B) 2A (C) 3A (D) 4A

19. If $\lim_{x \to 1} \frac{x + x^2 + x^3 + ... + x^n - n}{x - 1} = 66$ then the value of n is

(A) 9 (B) 10 (C) 12 (D) 11

20. The derivative of $\tan^{-1}\left(\frac{3x - x^3}{1 - 3x^2}\right)$ with respect to x is

(A) $\frac{3}{1+9x^2}$ (B) $\frac{1}{9+x^2}$ (C) $\frac{1}{1+x^2}$ (D) $\frac{3}{1+x^2}$

21. $\int \cos^{-1}\left(\frac{1 - \tan^2 x}{1 + \tan^2 x}\right) dx$ is

(A) x^2+c (B) $\frac{\cos 2x}{2} + x + c$ (C) $\tan^{-1}2x + c$ (D) $(sin^{-1}x)^2/2 + c$

22. The angle between the vectors $\vec{a} \times \vec{b}$ and $\vec{b} \times \vec{a}$ is

(A) 0° (B) 45° (C) 180° (D) 90°

23. The points (3, 3), (h, 0) and (0, k) are collinear if

(A) $\frac{1}{h} - \frac{1}{k} = \frac{1}{3}$ (B) $\frac{1}{h} + \frac{1}{k} = \frac{1}{3}$ (C) $-\frac{1}{h} + \frac{1}{k} = \frac{1}{3}$ (D) $\frac{1}{h} + \frac{1}{k} + \frac{1}{3} = 0$

24. The projection of a line on the coordinate axes are 2, 3, 6. Then the length of the line is

(A) 1 (B) 7 (C) 11 (D) 6

25. The young boy ogled at the beautiful ball in the shop. The synonym of 'ogled' is:

(A) complained (B) mixed (C) separate (D) stared

26. Locate the word with a silent /l/ in the middle.

(A) polite (B) colour (C) talk (D) below

27. The word 'confidence' has its primary stress on the …… syllable.

(A) first (B) second (C) third (D) fourth

28. The word …… has /æ/ sound in the middle.

(A) hall (B) halt (C) hollow (D) hat

29. Neither you nor I …… going there.

(A) are (B) am (C) were (D) have been

30. Make your lazy brother ……hard.

(A) work (B) to work (C) worked (D) working

31. I felt the house…….

(A) moving (B) moved (C) move (D) had moved

32. If I (be) you, I would save the money.

(A) am (B) are (C) were (D) had been

33. They …… that they'd be late for the programme.

(A) say (B) said (C) tell (D) is telling

34. Listen! The bell …….
(A) rang (B) has rung (C) was rung (D) is ringing

35. The pretty girl was lame …… one leg.
(A) of (B) by (C) with (D) in

36. The passive voice of 'Let him do it' is …….
(A) Let it done (B) Let it be done by him (C) Let it be done (D) Let him be done

37. One who is indifferent to pain and pleasure is called …….
(A) cosmopolitan (B) theist (C) heretic (D) stoic

38. Which of the following is a simple sentence?
(A) Spare the rod; spoil the child. (B) I paid off the debts which my father had contracted.
(C) Besides making a promise, she kept it. (D) Waste not, want not.

39. Two long capillary tunes A and B of radius $R_B > R_A$ dipped in same liquid. Then
(A) water rise is more in A than in B (B) water rise is more in B than in A
(C) same water rise in both (D) all of these according to the density of water

40. There is no loss of kinetic energy in
(A) perfectly inelastic collision (B) elastic collision
(C) inelastic collision (D) plastic collision

41. In which process, the rate of transfer of heat is maximum?
(A) conduction (B) convention
(C) in all these, heat is transferred with same speed (D) radiation

42. The critical angle of light passing from glass to air is minimum for
(A) violet (B) green (C) yellow (D) red

43. The transverse nature of light is shown by
(A) interference (B) diffraction (C) polarization (D) radiation

44. If a soap bubble is charged with negative charge, its radius
(A) will increase (B) will decrease (C) remain same (D) data is not sufficient

45. If a high power heater is connected to electric mains, then the bulbs in the house become dim, because there is
(A) potential drop (B) current drop (C) no current drop (D) no potential drop

46. At the magnetic poles of the earth, a compass needle will be
(A) bent slightly vertical (B) vertical
(C) horizontal (D) inclined at 45° to the horizontal

47. Inner walls of big halls should be a good sound
(A) amplifier (B) absorber (C) reflector (D) transmitter

48. If we consider electrons and photons of the same wavelengths, they will have same
(A) energy (B) velocity (C) momentum (D) acceleration

49. Magnetic quantum number specifies
(A) orbital size (B) orbital orientation (C) orbital shape (D) nuclear stability

50. In which of the following compounds, covalent and coordinate bonds are present?
(A) ammonia (B) potassium bromide (C) water (D) hydrogen peroxide

51. Bleaching action of SO_2 is due to
(A) displacement (B) oxidation (C) hydrolysis (D) reduction

52. The mass of 1 atom of He is
(A) $6.023\times$ X 10^{-24} g (B) 6.64×10^{-24}g (C) 3.34×10^{-24} g (D) 6.64×10^{-23} g

53. $BF_3$is
(A) Lewis base (B) Arrhenius base (C) Lewis acid (D) Bronsted – Lowry acid

54. Which one of the following show variable valency?
(A) d-Block elements (B) p- Block elements (C) s-Block elements (D) f- Block elements

55. Chalcopyrite is the ore of
(A) Cu (B) Zn (C) Fe (D) Na

56. For softening of water by Calgon's process which of the following compounds is used?
(A) Slaked lime (B) sodium hexametaphosphate
(C) sodium aluminium silicate (D) sodium carbonate

57. Anode used in Down's cell is
(A) iron vessel (B) carbon rod (C) graphite rod (D) platinum

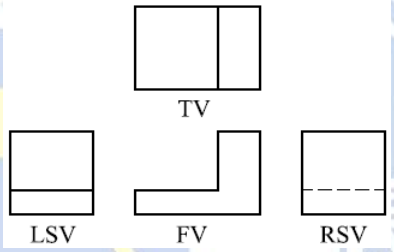
58. Conc. H_2SO_4 reacts with ethanedioic acid to form
(A) $CO + H_2O$ (B) $CO_2 + H_2O$ (C) $C_2H_4 + H_2O$ (D) $CO + CO_2 + H_2O$

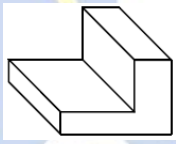
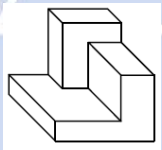
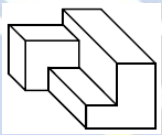
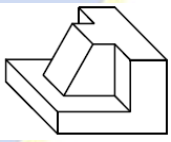
59. Hydrolysis of Aluminium carbide forms
(A) ethene (B) methane (C) ethyne (D) ethane

60. Monomers of Benzene are the molecules of
(A) ethane mole (B) ethylene (C) propylene (D) acetylene

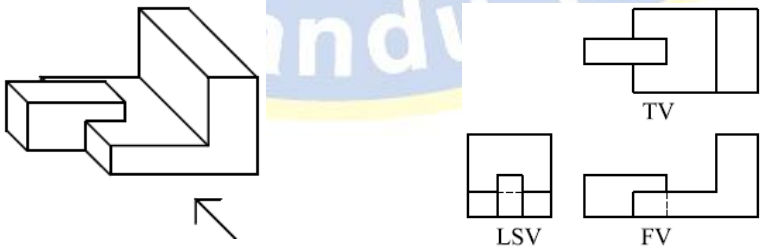
Section: II Select the Best Alternative on the answer sheet given **40×2 = 80**

61. Select the correct object for the given set of views. (FM 2)



(A)  (B)  (C)  (D) 

62. Which of the following view/s is wrong?(FM 2)



(A) Top view only (B) Left side view only
(C) Front view only (D) Both front and top views

63. The domain and range of the function f(x) = $\sqrt{4x - x^2}$ are

(A) R, [0, 2] (B) [-2, 2], [0, 2] (C) [0, 4], [0, 2] (D) [2, 4], [0, 2]

64. If sin2A + sin2B = sin2C then the triangle is
(A) right angled (B) equilateral (C) isosceles (D) scalene

65. In a football championship 153 matches were played. Every team played one match with each other, the number of teams participating in the championship is
(A) 17 (B) 18 (C) 19 (D) 20

66. If a, b, c are in A.P.; b, c, d are in G.P.; c, d, e are in H.P. then a, c, e are in
(A) A.P. (B) A. G.P. (C) H.P. (D) G.P.

67. The complex number $\frac{a+ib}{c+id}$ is purely real if
(A) ad = bc (B) ab = cd (C) ac = bd (D) ac = – bd

68. $1+\frac{1+2}{2!}+\frac{1+2+2^2}{3!}+.....to\infty$ is
(A) $e^2 - e$ (B) $e^2 - 1$ (C) e^2 (D) $e^3 - e^2$

69. If three vectors $\vec{a}, \vec{b}, \vec{c}$ satisfy $\vec{a} + \vec{b} + \vec{c} = 0$ and $|\vec{a}| = 3, |\vec{b}| = 5, |\vec{c}| = 7$ then the angle between $\vec{a}$ and $\vec{b}$ is
(A) 30° (B) 45° (C) 60° (D) 90°

70. If y = mx be one of the bisectors of the angel between the lines $ax^2 – 2hxy + by^2 = 0$ then
(A) $h(1 + m^2) + m(a – b) = 0$ (B) $h(1– m^2) + m(a + b) = 0$
(C) $h(1 – m^2) + m(a – b) = 0$ (D) $h(1 + m^2) + m(a + b) = 0$

71. The value of λ for which the circle $x^2 + y^2 + 2\lambda x + 6y + 1 = 0$ intersects the circle $x^2 + y^2 + 4x + 2y = 0$ orthogonally is
(A) $-\frac{5}{2}$ (B) –1 (C) $-\frac{11}{8}$ (D) $-\frac{5}{4}$

72. The line x – 1 = 0 is the directrix of the parabola $y^2 – kx + 8 = 0$. Then one of the values of k is
(A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) 4 (D) 8

73. The plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=3$ meets the coordinate axes in A; B - C. The centroid of the triangle ABC is
(A) $\left(\frac{a}{3},\frac{b}{3},\frac{c}{3}\right)$ (B) (a, b, c) (C) $\left(\frac{1}{a},\frac{1}{b},\frac{1}{c}\right)$ (D) $\left(\frac{3}{a},\frac{3}{b},\frac{3}{c}\right)$

74. The differential equation satisfied by the function $y=\sqrt{\sin x+\sqrt{\sin x+\sqrt{\sin x+\cdots}}}$ to ∞ is
(A) $(2y-1)\frac{dy}{dx}-\sin x=0$ (B) $(2y-1)\frac{dy}{dx}-\cos x=0$
(C) $(2y-1)\cos x-\frac{dy}{dx}=0$ (D) $(2y-1)\cos x+\frac{dy}{dx}=0$

75. The function f(x) = tanx - x
(A) sometimes increases and sometimes decreases (B) always decreases
(C) never decreases (D) always increase

76. If $f'(x)=e^x+\frac{1}{1+x^2}$ and f(0) = 1 then f(x) is
(A) $\tan^{-1}x – 2$ (B) $e^x + 2$ (C) $e^x + \sin^{-1}x$ (D) $e^x + \tan^{-1}x$

77. The area bounded by the curve $y = 4x - x^2$ and x-axis is

(A) 16 sq. units (B) $\frac{32}{3}$ sq. units (C) 32sq. units (D) $\frac{16}{3}$ sq. units

Read the passage and answer the questions from 78 to 81.

Through the break between the trees, she looked into one of the lighted windows above the shop. She could see the cartoons of biscuits neatly piled near the far wall. Against her conscious wishes Cissy's saliva glands starting pumping the fluid into her mouth. She felt her heart beating strongly from top of her throat into the back of her mouth. There is nobody, she thought. I can dash in and take a box and dash out again. I know it is a sin, but the Lord will not punish us if we are so hungry.

78. The whole passage is the description of…….
(A) Cissy's courage for stealing (B) Cissy's plan before stealing
(C) Cisssy's temptation before stealing (D) Cissy's greed for stealing

79. What was Cissy's reaction when she saw the biscuit cartoons?
(A) Her mouth started watering (B) She felt like vomiting
(C) She wanted to eat all the biscuits (D) She thought of ll the toffees she had eaten

80. Why did her heart beat strongly?
(A) She was eager to taste the biscuits. (B) She was thinking of stealing the biscuits.
(C) She thought nobody was watching her. (D) She was ill and running a temperature.

81. How do you know Cissy felt guilty?
(A) She felt her heart pounding inside her chest.
(B) She knew what she was doing was morally wrong.
(C) She was saying her prayers before she went to steal.
(D) She knew that she was about to do something selfish.

82. The velocity of the particle 6 m/s eastwards changes to 8 m/s northwards is 10 s. What is the magnitude of the average acceleration during this interval of time?
(A) 1.4 m/s^2 (B) 0.2 m/s^2 (C) 1 m/s^2 (D) 0.1 m/s^2

83. Two bodies A (of mass 1kg) and B (of mass 3kg) are dropped from the heights 16 m and 25 m respectively. The ratio of the time taken by them to reach the ground is
(A) 5/12 (B) 5/4 (C) 12/5 (D) 4/5

84. Weight of man when standing on a lift is 60N. What is the weight when he is standing on lift which is moving upwards with acceleration 4.6 m/s^2? (take g = 9.8 m/s^2)
(A) 60N (B) 90N (C) 30N (D) 3N

85. For steel Y = 2×10^{11} N/m^2. The force requires to double the length of a steel wire of area 1 cm^2 is
(A) 2×10^5 N (B) 2×10^6 N (C) 2×10^8 N (D) 2×10^7 N

86. Water rises in a capillary tube through a height h. If the tube is inclined to the liquid surface at 45°, the liquid will rise in the tube upto its length equal to
(A) $\sqrt{2}$h (B) h (C) h/$\sqrt{2}$ (D) 2h

87. The two fixed points of a thermometer are wrongly marked at 5°C and 95°C. It shows a reading of 41°C in a room. The correct room temperature is
(A) 41°C (B) 40.5°C (C) 40°C (D) 41.5°C

88. If the amount of heat given to a system be 35 joule and the amount of work done by the system be – 15 joule then the change in internal energy of the gas is
(A) – 50 joule (B) 20 joule (C) 50 joule (D) 30 joule

89. The tension in vibrating stretched piano wire is 10N. To duble the frequency, the tension in the wire must be

(A) 40 N (B) 20 N (C) 5 N (D) 80 N

90. An object of height 1.5 cm is placed on the axis of a convex lens of focal length 25 cm. A real image is formed at a distance of 75 cm from the lens. The size of the image will be
(A) 4.5 cm (B) 3.0 cm (C) 0.75 cm (D) 5 cm

91. In Young's double slit experiment, the maximum intensity is I_0. When one slit is closed, the intensity becomes
(A) $I_0/2$ (B) $I_0/3$ (C) I_0 (D) $I_0/4$

92. The period of oscillation of a freely suspended bar magnet is 4 second. If it is cut into two equal parts in length, then the time period of each part will be
(A) 2 sec (B) 4 sec (C) 8 sec (D) 1 sec

93. A capacitor of 20 μF is charged upto 500V and is connected in parallel with another capacitor of 10 μF which is charged upto 200V. The common potential is
(A) 400 V (B) 500 V (C) 300 V (D) 200 V

94. If two wires having resistances R and 2R are joined in series and in parallel then ratio of heat generated in this situation is
(A) 2:1 (B) 1:2 (C) 9:2 (D) 2:9

95. The work function of a metallic surface is 5.01 eV. The photoelectrons are emitted when light of wavelength 2000Å falls on it. The potential difference applied to stop the fastest photoelectrons is ($h = 4.14 \times 10^{-5}$ eV sec)
(A) 2.4 V (B) 2.24 V (C) 1.2 V (D) 4.8 V

96. If a sample of 16 gm radioactive substance disintegrate to 1 gm in 120 days, then what will be the half-life of the sample?
(A) 15 days (B) 7.5 days (C) 60 days (D) 30 days

97. IUPAC name of CH_3-CH_2- CH (CN) - CH_3 is
(A) 2- cyanobutane (B) 3- cyanobutane
(C) 3-methylbutanenitrile (D) 2-methylbutanenitrile

98. 0.873 amp current is passed through $CuSO_4$ solution for 3 minutes, the mass of Cu deposited at cathode is
(A) 0.0469 g (B) 0.0517 g (C) 0.036 g (D) 0.0145 g

99. If 250 ml of 0.25 M NaCl solution is diluted with water to a volume of 500 ml, the new concentration of the solution is
(A) 0.167 M (B) 0.125 M (C) 0.08333 M (D) 0.0167 M

100. A pungent gas formed by heating Sal ammoniac with slaked lime on oxidation in the presence platinum gauze forms
(A) N_2 (B) NO_2 (C) HNO_3 (D) NO

****